Digit Shuffle

Overview

Students arrange three digit cards to make numbers that fit a description, such as largest, smallest, or closer to 300. They compare their numbers and identify the number that fits each description most closely.

Objectives

Thinking Skills:	Students use number sense to create a 3-digit number that fits a description. They compare the number to another number and explain their reasoning as they decide which fits the description better.
Mastery Skills:	Students learn to compare larger blocks or values first, as they order 3-digit numbers. They learn characteristics of even and odd numbers and practice comparing numbers according to size or location closer to a number between 1 and 1000.

Materials

Each pair of students needs:
- One set of Digit cards for each student
- "Digit Shuffle" recording sheet (activity sheet 1)
- Selection of blocks to 1000

For demonstration:
- Overhead transparencies of the recording sheet and digit cards (optional)

For closure, each student needs:
- "Digit Shuffle Dilemma" (activity sheet 2)

Class Introduction   (15 - 20 minutes)

Write the numbers, 5, 9, and 2 on separate cards. Explain that these are the digits in a 3-digit number. Each digit can represent the number of blocks-of 100, blocks-of-10 or singles in the number.
- Arrange the digits to make the number 295. Ask, **What would this number look like on the place mat or counter?** Have students model the number with blocks.
- Ask, **What is the <u>smallest</u> number I could make with these digits?** Have students arrange the cards and model the number 259 with blocks. Ask, **How do you know it is the smallest possible number?**
- Discuss the significance of the 2 representing hundreds, or the largest value. Note that the smallest digit, 2, is in this place. Any other digit would show 5 or 9 hundreds. Have them compare 259 with the previous number, 295. Ask, **Which is smaller? How do you know?** Discuss the fact that both numbers have 2 hundreds so they need to consider the tens place next. Ask, **Why do we look at the tens place? When would we have to consider the ones place?** Students should explain that only if the hundreds <u>and</u> tens digits are the same do they need to move to the ones place.
- Repeat, having students show the largest number, the number closest to 306, and the number closest to 729. Be sure to have students explain and prove their thinking with blocks, a number line, or any other materials.

Ask, **What is the largest <u>even</u> number I can make?** This will prompt some discussion about how to identify even and odd numbers.
- Students should have some understanding of smaller even numbers, and many classmates will be able to explain how to apply the idea to larger numbers.
  - Use the blocks to model the pairing idea of even numbers, or to show that even numbers can be fairly divided into 2 equal parts. Begin with a small number, such as 12. Then work up to larger numbers. Show these numbers on a number line.

- Students will conclude that even numbers all have a 0, 2, 4, 6, or 8 in the ones place regardless of the digits in the tens or hundreds places.

- Continue the discussion, this time focusing on <u>odd</u> numbers. Model odd numbers with blocks to show that they are not paired (there is always a leftover).

Explain that students will be playing a game called "Digit Shuffle," in which they will arrange different digit cards to make large, small, "close to," even, and odd numbers, similar to what they have just done as a class.

Demonstrate "Digit Shuffle" by having two student volunteers play the game. It may be helpful to make a transparency of the recording sheet and digit cards (cut them apart) so that different digit arrangements can be tried and compared on the overhead projector. Divide the class in half for this demonstration, each half being the "advisors" to each player. To begin:
- Each player shuffles a set of digit cards and places them face down.
- Each player draws 3 cards.
- Players seek advice from their classmates on how to arrange the digits to make numbers that fit each description on the recording sheet.
- Each player records his or her arrangement and then compares the two numbers to identify the number that is best fits the description. It is possible that a player cannot make an odd or even number with the digits he or she has drawn. In this case, the other player is certain to win the turn.
- Draw a ☆ in the column next to the number that best fits the description.
- The winner of the game has more stars. Because there are 6 rounds, it is possible to have a tie!

Hand out the recording sheets and have students pair up to play the game themselves.

As students are playing the game, have them discuss the various arrangements of the digits and have them explain how they know a particular order best meets the description.

Have students share their experiences with the game. Questions for discussion include:
- **What digits did you draw? How did you decide to arrange your digits to make the largest, smallest, etc. numbers?**
- **How did you and your partner compare numbers to decide whose number was smaller, larger, closer to 306, . . .?**
- **Which numbers were the most challenging to compare? Why?**
- **If you could select (not draw) any 3 digits to play the game, what numbers would you pick? Why?**

Have students complete the Digit Shuffle Dilemma activity sheet to further evaluate their understanding.

Assessment
As students work, observe and note:
Do they-
- Use a valid technique and compare numbers accurately?
- Understand the significance of place value as they compare numbers?
- Model their thinking with materials?
- Rely more on a counting model or on a place value understanding to compare numbers?

Extension
- Have students arrange and compare 4 digit cards as they play "Digit Shuffle" with 4-place numbers. Use the star column for the fourth place and note each turn's winner by drawing a star **outside** of the table. On the recording sheet, add a 0 to 306 and 729 to make 3060 and 7290.